

4. Wavelength shifting of VCSELs.

The comparison of the spectral performance of the VCSELs on diamond versus Kovar demonstrated provided two results of note.

When observed over comparable period at 5V, the VCSELs on diamond had slightly better spectral stability. The VCSEL on Kovar had a small blue shift over time. Statistically, the variation between the two was small as shown in table 4.

Diamond	Diamond	Kovar	Kovar
Mean Wavelength std dev	Peak Wavelength std dev	Mean Wavelength std dev	Peak Wavelength std dev
3.31272E-11	3.23E-11	4.16378E-11	3.99E-11

Table 4. Standard deviation of wavelength stability of diamond and Kovar mounted units.

The VCSEL mounted on diamond exhibited 6 abrupt shifts in mean wavelength during the 41 days of testing. Three of the shifts correlated to increases in the bias supplies. Three did not correspond to any change in the test conditions. The shifts are both higher and lower in wavelength. Incidentally, the peak wavelength exhibited only 3 shifts, each occurring at bias increase and each shift was a red shift. The VCSEL mounted on Kovar exhibited one wavelength shift, corresponding to the increase in bias voltage from 5V to 6.25 volts. There is insufficient data to draw any conclusions about the wavelength shifting over than the appearance of mode shifts within the VCSEL. Additional characterization on a wider sample population and some knowledge of the VCSEL construction would be required.

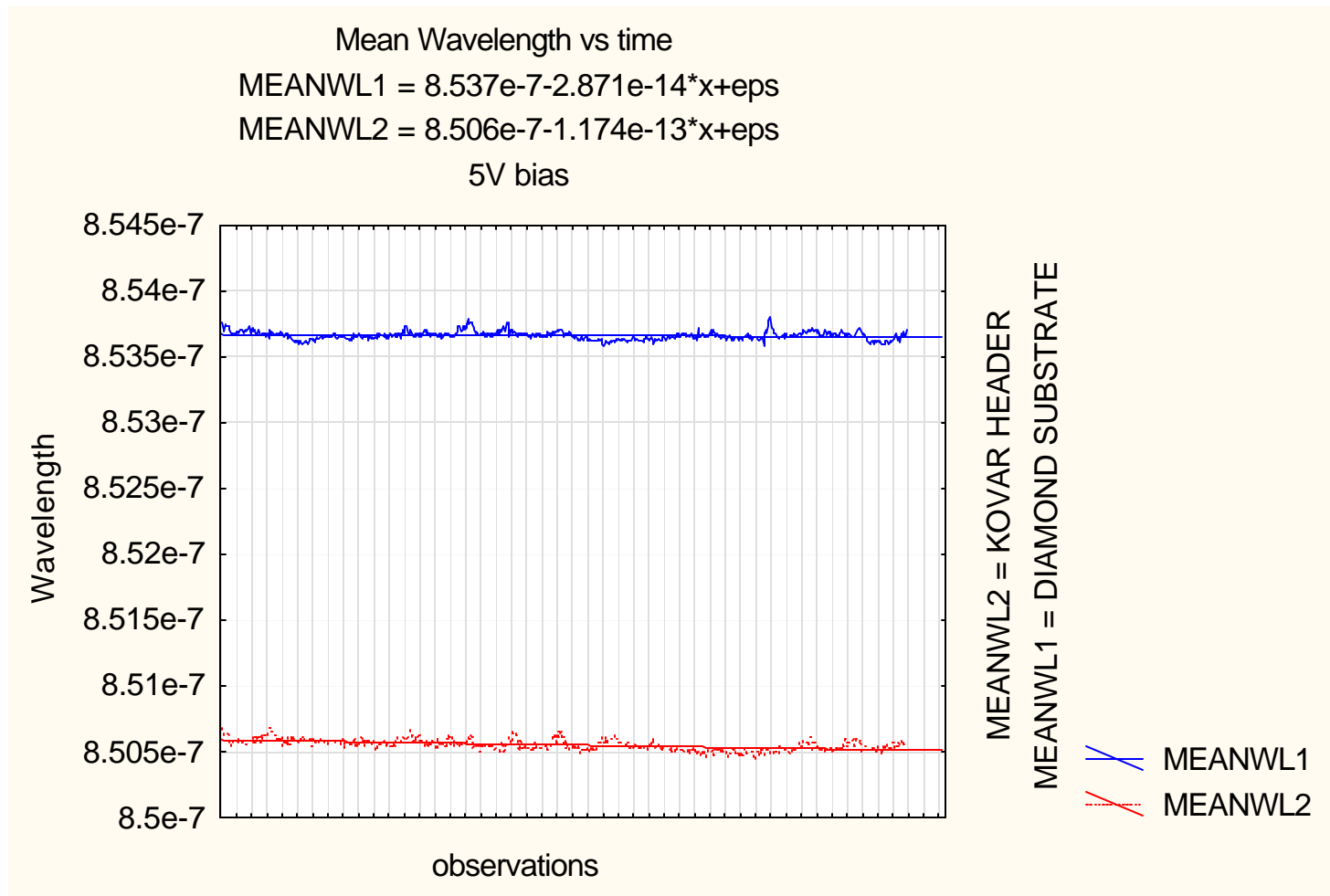


Figure 18. Mean wavelength vs time at 5V

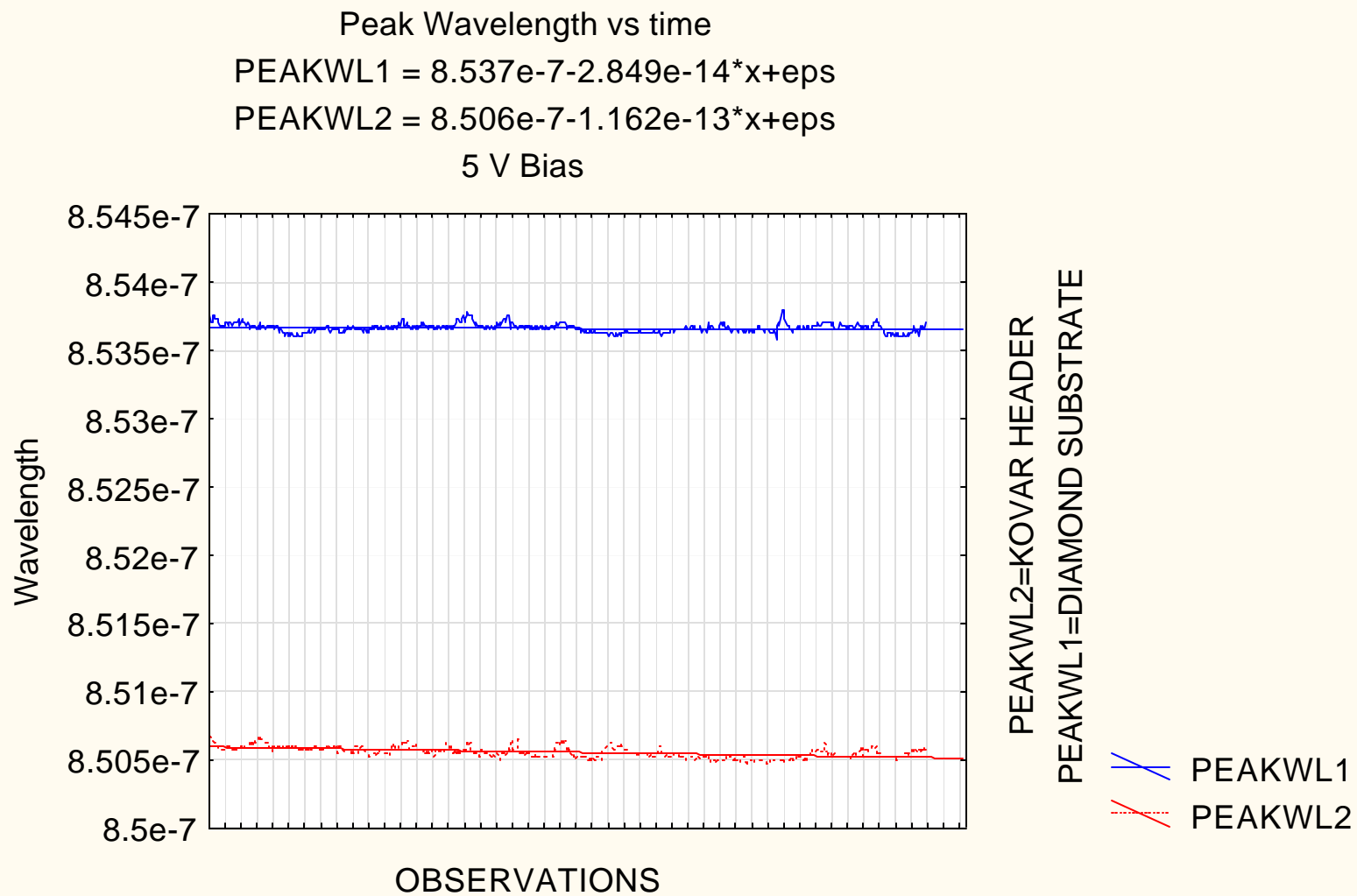


Figure 19. Peak wavelength vs. time at 5V

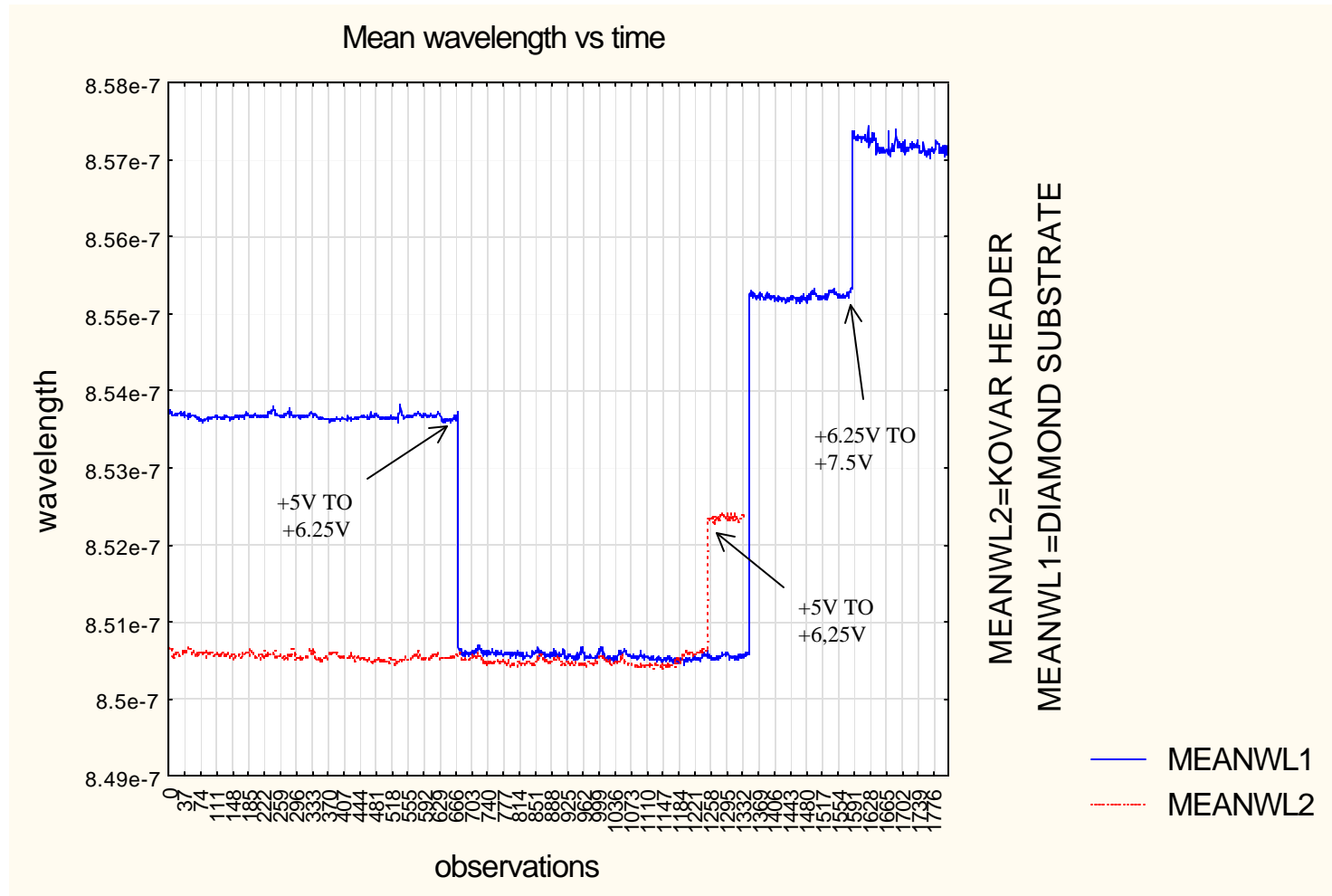


Figure 20. Mean wavelength vs. time for the entire test

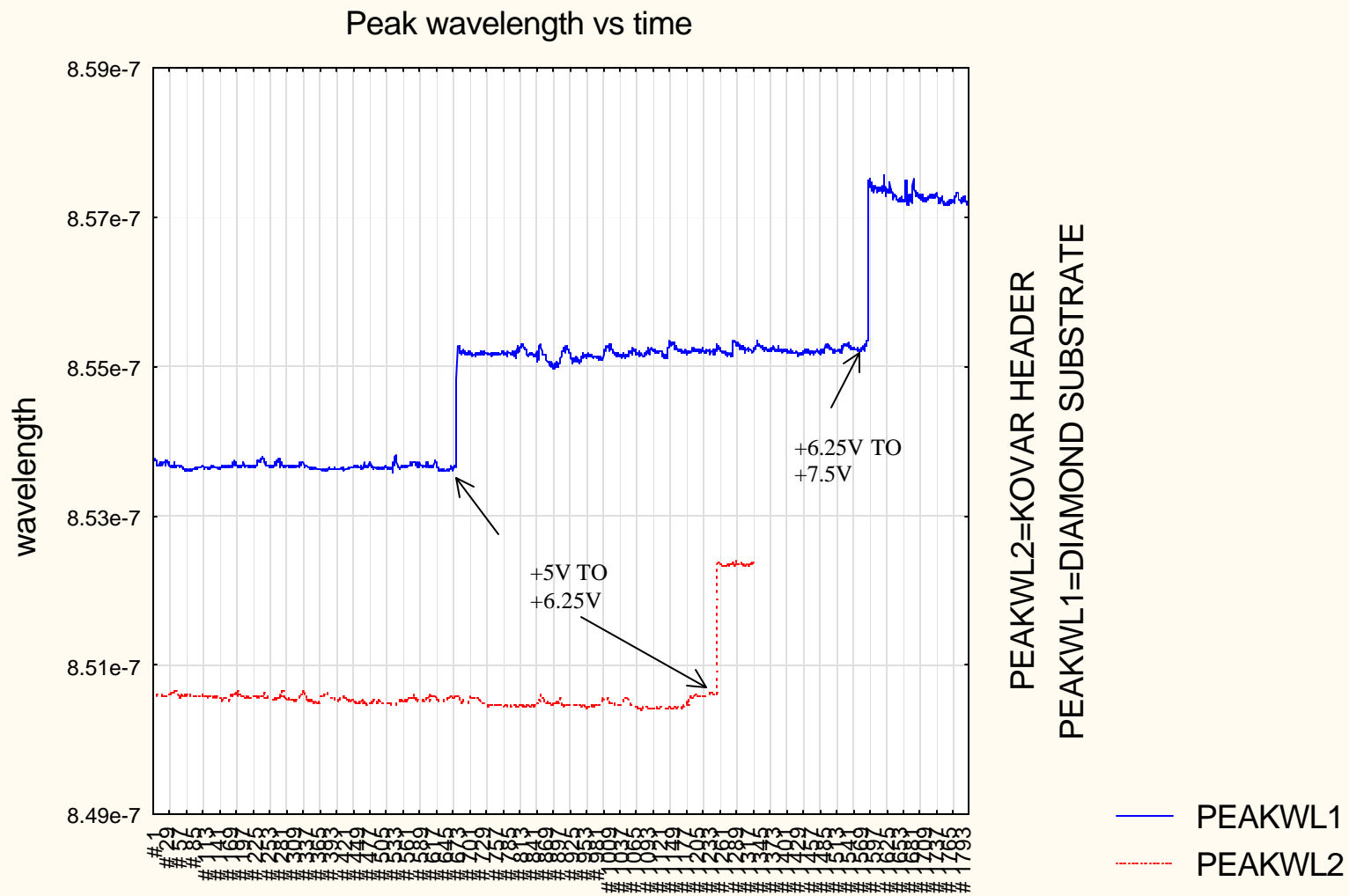


Figure 21. Peak wavelength vs. time for the entire test